

REMARKS

Favorable reconsideration of this application is respectfully requested in view of the previous amendments and following remarks.

Claims 1-14 are pending. By this Amendment claims 1, 4-7 and 9 are amended to address formalities and new claims 13 and 14 are added.

The Examiner rejects claims 4-7 and 9 under 35 U.S.C. §112 second paragraph. Claims 4 and 7 are amended to address issues regarding antecedent basis. Claims 6 and 9 are amended and claims 13 and 14 are added to address issues regarding broad and narrow limitations. Withdrawal of this rejection is respectfully requested.

The Examiner rejects claims 1-5, 8 and 10-12 under 35 U.S. C. §103(a) over U.S. Patent No. 4,981,425 to Lierke et al. in view of U.S. Patent No. 5,164,198 to Bauckhage et al. and U.S. Patent No. 3,198,170 to Onishi; rejects claims 6 and 7 under 35 U.S.C. §103(a) over Lierke, Bauckhage and Onishi and further in view of U.S. Patent No. 5,259,593 to Orme et al.; and rejects claim 9 under 35 U.S.C. §103(a) over Lierke, Bauckhage and Onishi and further in view of U.S. Patent No. 4,600,472 to Pitchon et al. These rejections are respectfully traversed.

Neither the Lierke patent, the Bauckhage patent nor the Onishi patent disclose or suggest a paint feeding device by which paint can be fed into the vicinity of a maximum of the sound particle velocity of an ultrasonic field, wherein the paint feeding device has in the region of the standing ultrasonic field at least two pieces of pipe for discharging paint, and wherein at least two of the pieces of pipe are arranged in the region of a selected maximum of the sound particle velocity of the standing ultrasonic field, as in Applicants' independent claim 1. Such features

encompasses Applicants' exemplary embodiment as illustrated in Fig. 1, wherein pipes 30, 31, 32 are situated at a maximum of the sound particle velocity. Applicants respectfully disagree with the Examiner's assertion in the Office Action on page 4, paragraph 4, beginning at line 5 that the pipe 7 disclosed in the Lierke patent is arranged in the region of a selected maximum of the sound particle velocity of a standing ultrasonic field. The Lierke patent description relates to the provision of molten metals. As discussed in the Lierke patent at column 3, beginning at line 50, a pressure sensor 8 is provided which measures the sound pressure of the standing wave 14 and passes the maximum value onto the electronic guiding system 9. The electronic guiding system 9 always seeks that position where the pressure of the sound field 14 is at its maximum. Thus, the Lierke patent relates to sound pressure and not to the maximum of the sound particle velocity as in Applicants' claim 1.

The Bauckhage patent does not overcome the deficiencies of the Lierke patent. The Bauckhage patent relates to an apparatus for pulverizing a jet of liquid material, such as molten material. The Examiner cites the Bauckhage patent for teaching a plurality of crucibles 10 as shown in Figure 5. Three crucibles 10 are located parallel to oscillating axis 24 and the jets emerging therefrom are directed to the three nodal areas 28 and 29 of the ultrasonic field 27 to pulverize the liquid metal discharged from the crucibles 10. The Bauckhage patent does not disclose arranging the crucibles 10 in a region of a selected maximum of a sound particle velocity.

The Onishi patent does not overcome the deficiencies of the Lierke and Bauckhage patents. In the Onishi patent, an ultrasonic wave vibrating element is fixed to a vibrating plate 5. Deflection of the vibrating plate 5 due to the density of the ultrasonic wave energy concentration in the vibrating plate 5 causes atomization

of the paint supplied from the paint tank 9 and forces the paint particles to be projected onto the article 10.

The Examiner recognizes that neither the Lierke nor Bauckhage patents explicitly teach a paint feeding device. The Examiner cites the Onishi patent as teaching use of an ultrasonic wave atomizer to provide a paint spray mist. However, Applicants' claim 1 combination recites a paint feeding device that has at least two pieces of pipe discharging paint in the region of the standing ultrasonic field. In the Onishi patent, paint is discharged by a vibrating plate 5. The Onishi patent provides no teaching or suggestion of at least two pieces of pipe for discharging paint in the region of a selected maximum of the sound particle velocity of a standing ultrasonic field. Regardless of whether the Lierke, Bauckhage and Onishi patents are considered individually or in the combination relied upon by the Examiner, they therefore fail to teach or suggest Applicants' claim 1 combination of features. As such, claim 1 is allowable.

The remaining dependent claims are allowable for at least the reasons discussed above as well as for the individual features they recite.

For example, Applicants' claim 4 recites that paint outlet openings of the at least two pieces of pipe in the region of the selected maximum of the sound particle velocity of a standing ultrasonic wave are arranged on an imaginary straight line, wherein the straight line is perpendicular to an imaginary center line which passes through the centroids of opposing sound faces of the sonotrode and of the component. The crucibles 10 of Fig. 5 of the Bauckhage patent are arranged parallel to the oscillating axis 24.

Neither the Orme nor Pitchon patents provide the deficiencies of the Lierke, Bauckhage or Onishi patents described above. As such, all pending claims are allowable.


Early and favorable action with respect to this application is respectfully requested.

Should the Examiner have any questions regarding this Amendment or the application in general, he is invited to contact the undersigned at the number provided below.

Respectfully submitted,

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